



Assessment and distribution of pharmaceuticals and hormone products in wastewater and water resources of the Gallatin Valley, Gallatin County, Montana



SPONSOR: Gallatin Local Water Quality District
TECHNICAL SUPPORT: Montana Bureau of Mines and Geology

Definition: Pharmaceuticals, personal care products, and endocrine-disrupting chemicals (PPCPs)

GOALS:

1. Document and quantify the ability of different wastewater treatment systems used in the Gallatin Valley to remove PPCPs, and quantify the loading of PPCPs to State waters from treated effluent.
2. Determine the extent and magnitude of PPCP contamination in State waters in the Gallatin Valley.
3. Evaluate potential risks to public health and aquatic ecosystems from PPCP contamination and recommend options for reducing PPCP contamination of State waters.

REASONS FOR CONCERN

State Level

A recent study showed that PPCPs were present in **80%** of drinking water wells sampled in the Helena Valley, Montana.

A study of sewage treatment facilities in the Missoula Valley, MT showed that the municipal treatment facility more efficiently removed PPCPs from the waste stream than did septic systems.

PPCPs were found in **all four** of the Montana streams sampled as part of a **national survey** to determine the presence of PPCPs in streams throughout the United States.

Commonly prescribed antibiotics such as the sulfonamides are persistent and not effectively removed in septic systems. Introducing low concentrations of persistent antibiotics can induce resistance in natural microbe populations. Sulfamethoxazole was present in **78%** of the wells in the Helena Valley.

National Level

In a recent study, **80%** of the male bass in the Potomac River Watershed were found to have feminine physical characteristics, including eggs. Feminization of male fish was even found in rural parts of the watershed.

International Level

PPCPs have been linked to the wide spread feminization of male fish in streams of the United Kingdom.

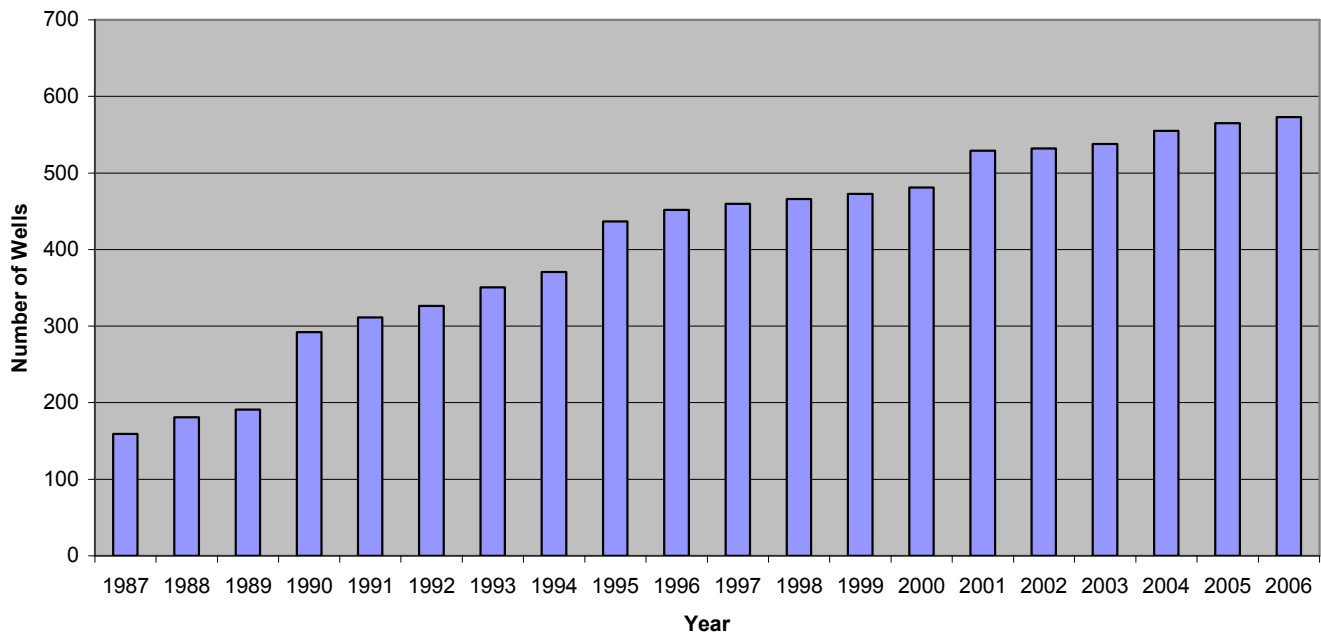
Diclofenac has caused the **near extinction** of the white-backed, long-billed, and slender-billed vulture populations in Asia, which has led to an environmental crisis in some countries. Diclofenac is a common PPCP and was found in 18% of the Helena Valley wells sampled for PPCPs.

Potential Impacts for the State of Montana and Gallatin County:

- ◆ Gallatin County is one of the fastest growing counties in the State. Much of the growth is in the form of non-sewered subdivisions, which use septic systems for sewage treatment and disposal.
- ◆ This study will assess the current level of PPCP contamination of the ground-water and surface-water resources in Gallatin County.
- ◆ This study will also assess the effectiveness of several different sewage treatment approaches.
- ◆ The findings from this study will be applicable to many other areas of Montana.

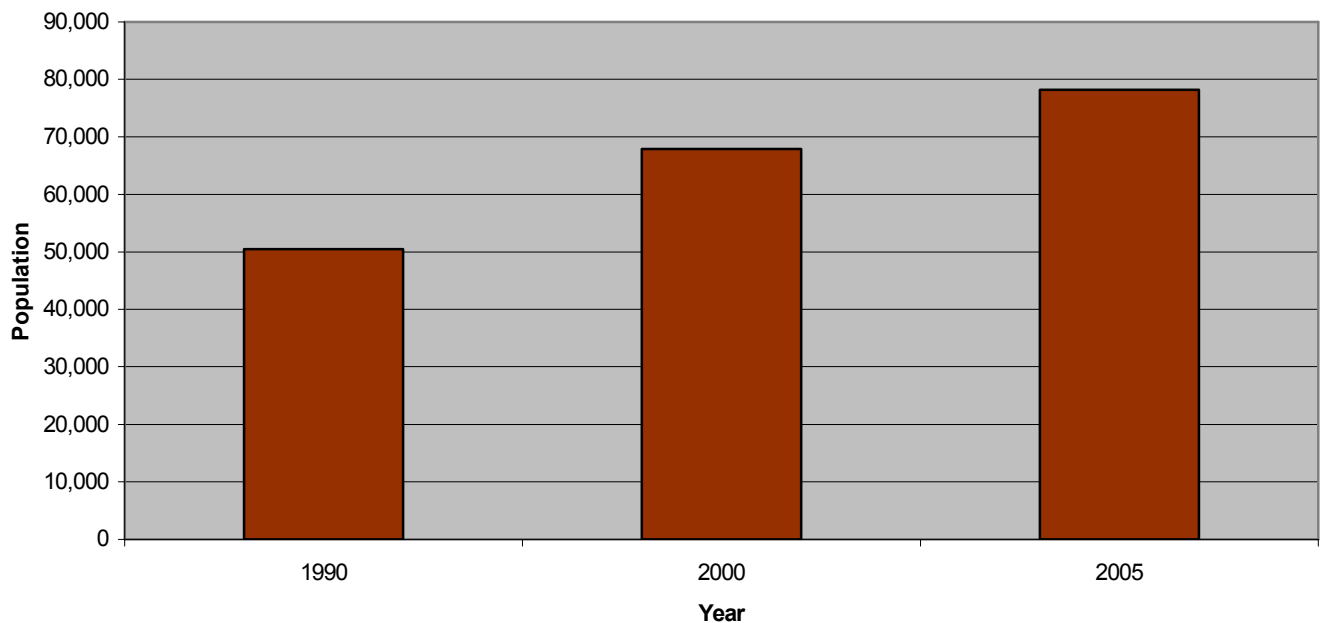
Population Growth Trend in Gallatin County, Montana

**Wells Drilled in Gallatin County, MT
1987 - October 2006**



Source: Ground Water Information Center, Montana Bureau of Mines and Geology

**Population Growth Gallatin County, MT
1990 - 2005**



Source: US Census Bureau State & County QuickFacts